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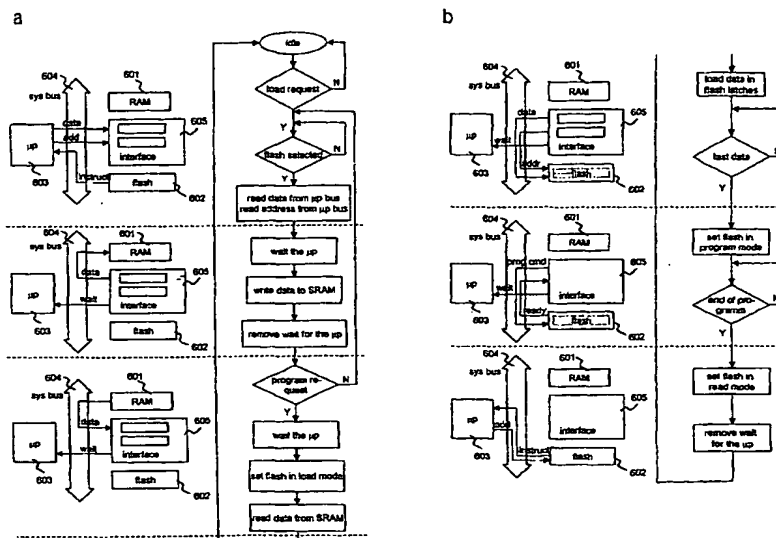
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(54) Title: **METHOD AND APPARATUS FOR WRITING DATA TO A NON-VOLATILE MEMORY**



(57) **Abstract:** The invention is a method and a circuit for writing data (DATA) from a processor (603) to a non-volatile memory (602) embedded in an integrated circuit. The main objective is to optimize the use of this embedded non-volatile memory. The method comprises a number of steps: The data to be written to the non-volatile memory (602) is first transferred to a volatile memory (601). Thereafter, a wait signal (wait) will be send to the processor (603). Then, the data (DATA) will be transferred from the volatile memory (601) to the non-volatile memory (602). At last, the wait signal (wait) will be removed. Thus the non-volatile memory (602) can be used both as instruction memory and as RAM, which achieves the main goal of this invention. The corresponding circuitry is a complex integrated circuit equipped to execute the above functions.

INTERNATIONAL SEARCH REPORT

Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F9/24 G06F9/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 974 528 A (KUO FANG-MING ET AL) 26 October 1999 (1999-10-26) the whole document	1-10, 12
X	DE 100 52 877 A (SAMSUNG ELECTRONICS CO LTD) 2 August 2001 (2001-08-02) the whole document	1-12
X	US 4 382 279 A (UGON MICHEL) 3 May 1983 (1983-05-03) the whole document	1-10
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>BROWN C ET AL: "SIMULTANEOUS CODE EXECUTION AND DATA STORAGE IN A SINGLE FLASH MEMORY CHIP FOR REAL TIME WIRELESS COMMUNICATION SYSTEMS" PROCEEDINGS OF THE 40TH MIDWEST SYMPOSIUM ON CIRCUITS AND SYSTEMS. MWSCAS '97. SACRAMENTO, CA, AUG. 3 - 6, 1997, MIDWEST SYMPOSIUM ON CIRCUITS AND SYSTEMS, NEW-YORK, NY: IEEE, US, vol. 2, 3 August 1997 (1997-08-03), pages 740-745, XP000789261 ISBN: 0-7803-3695-X page 742, right-hand column -page 743, left-hand column</p>	1,9
A	<p>DIPERT B ET AL: "DESIGNING AN UPDATABLE BIOS USING FLASH MEMORY" MICROPROCESSORS AND MICROSYSTEMS, IPC BUSINESS PRESS LTD. LONDON, GB, vol. 16, no. 8, 1992, pages 427-446, XP000330850 ISSN: 0141-9331</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

Patent

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5974528	A	26-10-1999	JP	3032747 B2	17-04-2000
			JP	11306009 A	05-11-1999
DE 10052877	A	02-08-2001	KR	2001070149 A	25-07-2001
			CN	1295278 A	16-05-2001
			DE	10052877 A1	02-08-2001
			IT	T020000999 A1	23-04-2002
			TW	486668 B	11-05-2002
US 4382279	A	03-05-1983	FR	2461301 A1	30-01-1981
			DE	2916658 A1	31-10-1979
			DE	2954731 C2	01-09-1994
			GB	2022884 A ,B	19-12-1979
			HK	25687 A	03-04-1987
			JP	1592825 C	14-12-1990
			JP	54154954 A	06-12-1979
			JP	61022828 B	03-06-1986
			JP	2132520 A	22-05-1990
			JP	6223206 A	12-08-1994
			JP	1843982 C	12-05-1994
			JP	2027687 B	19-06-1990
			JP	63145531 A	17-06-1988